



# Aultmore Wind Farm Redesign

## Technical Appendix 2.1: Outline Construction Environment Management Plan

### Vattenfall Wind Power Ltd.

Client Address

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## Acronyms and Abbreviations

AIL	Abnormal Indivisible Load
BESS	Battery Energy Storage System
CDM	Construction (Design and Management)
CEMP	Construction and Environment Management Plan
CPP	Construction Phase Plan
CTMP	Construction Traffic Management Plan
EIA	Environmental Impact Assessment
EnvCoW	Environmental Clerk of Works
FLS	Forestry and Land Scotland
MOD	Ministry of Defence
RAL	Reichs-Ausschuss für Lieferbedingungen
SEPA	Scottish Environmental Protection Agency
SuDS	Sustainable Drainage System
WMP	Waste Management Plan
WSI	Written Scheme of Investigation



## 1.0 Introduction

This outline Construction Environmental Management Plan (CEMP) is submitted by the applicant as a Technical Appendix to the EIA Report. The principal objective of this document is to provide information on the methodologies to construct and decommission the proposed development.

As the outline CEMP is being prepared as part of the application, the Vattenfall Wind Power Ltd (the 'applicant') is yet to appoint a wind turbine manufacturer or contractors to undertake the electrical or civil engineering works. The Principal Contractor appointed to construct the proposed development will prepare detailed method statements to construct the works which will incorporate the details outlined in this outline CEMP.

This outline CEMP sets out the overarching construction management approach for the proposed development and provides further details on specific activities that will be undertaken on the Site.

### 1.1 Proposed Development

The proposed development includes the installation of up to 16 wind turbines (with a maximum tip height of 200m) and associated infrastructure, including wind turbine external transformers, underground cabling, site entrance, access tracks, turning heads, crane hardstands, substation compound and battery energy storage system (BESS) compound. During construction and commissioning there would be a number of temporary works including construction compounds with car parking, temporary parts of crane hardstands, welfare facilities and borrow pits.

An outline construction programme is shown in **Table 1.1** for information.



**Table 1.1: Outline Construction Programme**

Activity/Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Establish Temporary Compound	█																				
2. Install Welfare Services & Establish Water Supply	█																				
3. Borrow Pit Development and Operation	█	█	█	█	█	█	█	█	█	█	█										
4. Establish Central Laydown Area & Procure Materials		█																			
5. Create Site Access Entrance at B9016	█	█	█																		
6.. Wind Farm Tree Felling		█	█	█	█	█															
7. Construct Access Tracks			█	█	█	█	█	█													
8. Import Materials (Road Capping, etc.)						█	█	█	█												
9. Construct Turbine Foundations & Hardstandings					█	█	█	█	█	█											
10. Construct Buildings & External Equipment			█	█	█	█	█	█	█	█											
11. Internal Fit											█	█									
12. Install Wind Farm Cabling								█	█	█	█	█	█	█							
13. Erect WTGs										█	█	█	█	█	█						
14. Commission WTGs															█	█	█				
15. WTG/WF Reliability Run & Grid Compliance																█	█	█	█		
16. Take Over																				█	
17. Site Restoration																			█	█	█





## 1.2 Condition of Consent

Consent and deemed planning permission for the construction and operation of the proposed development is yet to be received. Upon receiving conditions, the applicant will provide an updated CEMP to illustrate how applicable conditions will be discharged, aligning current construction methods with relevant legislation and environmental protection practices.

## 1.3 Community Liaison

Throughout the construction period of the proposed development, the applicant will maintain an open dialogue with local residents and all other interested parties. The applicant will ensure the local community is provided with regular updates on construction progress and upcoming activities through appropriate channels.

A member of staff will be appointed for responsibility of key contact between the applicant and the community. This person will be the nominated point of contact for local residents in connection with any issues that may be raised during construction, operation and decommissioning of the proposed development.

Any change to the appointed person shall be communicated to the planning authority and the local community representatives as required.

## 2.0 General Construction Management Principals

The proposed development will be constructed in accordance with the EIA Report prepared during its development stage and in line with good practice outlined in the Scottish National Heritage guidance 'Good Practice during Windfarm Construction' – 4th Edition 2019.

Throughout its development, the aim has been to ensure the design:

- Minimises the extent of infrastructure;
- Avoids sensitive habitats;
- Minimises environmental impacts; and
- Minimises hazards and risks.

A construction phase plan will be produced to cover the proposed development construction period.

Where appropriate and practicable, local plant and materials will be used to maximise the benefit of the proposed development to the local economy.

## 2.1 Environmental Management and Pollution Prevention

Specific procedures to ensure that the local environment is protected during construction works are managed through the management system procedures and policies which is certified to ISO 14001 with the applicant.

### 2.1.1 Contractor Requirements

Details of the environmental management and emergency procedures to be adopted by the Principal Contractor during the construction phase will be provided by the applicant to the Principal Contractor during the procurement process. Vattenfall have well established policies and procedures in place that have been used on previous wind farm developments.



## **2.1.2 Surface and Ground Water Management**

A sustainable drainage system (SuDS) will be implemented to provide surface water management techniques to mitigate any adverse impact on the hydrology within the site.

The SuDS will be developed and included as part of a greater Pollution Prevention Plan, to be included within the update to the CEMP prior to construction. It is proposed that this Pollution Prevention Plan will be submitted to the Scottish Environment Protection Agency (SEPA) included within an application for a Complex License under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR).

## **2.1.3 Water Quality Monitoring**

Any potential pollution incident on-site that may impact water quality will be dealt with in accordance with the Pollution Prevention Plan, to be developed prior to construction.

Water quality monitoring will be undertaken on discharge waters during the construction phase to ensure that the proposed development does not impact on local watercourses and rivers.

A bespoke Water Quality Monitoring Plan will be prepared and implemented by a specialist consultant, detailing monitoring locations, sampling frequency and the methodology for chemical and biological analyses. Site sensitivity will be considered when deciding the level and frequency of sampling and the Water Quality Monitoring Plan discussed and agreed with the relevant authorities prior to implementation. Private Water Supply Monitoring will be included in this Plan.

The exact location of each sampling point will be determined during a walkover survey and will reflect the point on all relevant controlled waters closest to the proposed development. Sampling points up- and down-stream of the construction activity will be selected to provide a full profile of the controlled waters.

A baseline report will be prepared following initial pre-construction water quality monitoring. This report will provide details of any contamination concentrations recorded and will be used to depict uncontaminated background pollution levels for the proposed development.

In the event of a potential pollution incident, all relevant monitoring points would be visited and re-sampled to determine any changes relative to the baseline data. A report detailing the findings would be prepared for each incident and recommendations provided for further monitoring and / or requisite mitigation measures.

Following completion of construction, all sample points will be revisited, re-sampled and analysed for a full suite of analytical parameters and a further report prepared discussing any impacts upon water quality arising from the construction process.

## **2.1.4 Foul Water Management**

Foul drainage will be provided in agreement with the relevant authorities and most likely be drained to a sealed tank and routinely removed from site (i.e., there shall be no discharge on the site).

## **2.1.5 Noise Management**

The sources of construction noise are temporary and vary in location, duration and level as the different elements of the proposed development are constructed. Construction noise arises primarily through the operation of large items of plant and equipment such as



excavators, diesel generators, vibration plates, concrete mixer trucks, rollers etc. Noise also arises due to the temporary increase in construction traffic near the proposed development.

BS 5228-1:2009 'Noise control on construction and open sites; Part 1 – Noise' is identified as being suitable for the purpose of giving guidance on appropriate methods for minimising noise from construction activities.

For all activities, measures shall be taken to reduce noise levels with due regard to practicality and cost as per the concept of 'best practicable means' as defined in Section 72 of the Control of Pollution Act 1974.

It is proposed the following noise mitigation measures will be implemented where appropriate and in line with further guidance from BS 5228-1:2009+A1:2014

- Consideration will be given to noise emissions when selecting plant and equipment to be used. Where appropriate, quieter items of plant and equipment will be given preference.
- All equipment should be maintained in good working order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable;
- Stationary noise sources shall be sited as far as reasonably possible from residential properties and, where necessary and appropriate, acoustic barriers installed to further reduce the impact;
- The movement of vehicles to and from the site will be controlled;
- Employees will be instructed to ensure compliance with the noise control measures adopted; and
- Construction works will not vary from agreed working hours unless exemption is consented.

Should it be considered necessary to further reduce noise levels, mitigation measures would be considered, and appropriate measures will be undertaken.

There are many strategies that could be employed to reduce construction noise levels; BS 5228-1:2009+A1:2014 also states that the 'attitude to the contractor' is important in minimising the likelihood of complaints and therefore consultation with the local community should occur. Non-acoustic factors such as mud on roads and dust generation, which can also influence the overall level of complaints, will also be controlled as detailed elsewhere in this document.

In the event that noise complaints are received, the applicant will contact the complainant and if required, visit the property to discuss the complaint and subjectively assess the noise levels. If the noise complaint is found to be merited, additional mitigation measures will be adopted.

In the event a resolution cannot be reached between the applicant and the complainant, the planning authority will be informed in order that they can carry out their own subjective assessment and if required agree any additional mitigation.

All noise complaints will be recorded alongside actions taken to resolve the issue. These records will be available to the planning authorities on request.



### 2.1.6 Dust Management

The potential issue of dust creation during construction will be weather and season dependent, therefore detailed dust management methods will be subject to the works programme and contractor working methods.

Dust management will be continuously undertaken in accordance with industry best practice to ensure that any local sensitive receptors are not affected by nuisance levels of dust from the works.

The following methods of dust suppression will be considered during the construction phase as required:

- Access tracks to be damped down using bowser or other suitable system;
- Road sweeper to be used to remove loose material from adjacent public roads during construction;
- Cleaning of vehicles, including provision of waterless wheel washing facilities, prior to exiting site onto the public road;
- Soil erosion control measures;
- Speed limits to be put in place to ensure low vehicle speeds;
- Vehicle loads to be covered;
- Damping of dry excavations and cutting activities which generate dust; and
- Sequencing of works to minimise the time that soils are exposed.

### 2.1.7 Spoil Management Bunds

Excavated peat, topsoil and subsoil are expected to be reused within the site either as part of backfilling or reinstatement operations or used to form landscaping bunds. Materials will generally be stockpiled close to the location of reuse to limit vehicle movements on-site. Details of peat and soil stripping at the site and the proposed use and placement of peat, topsoil and subsoil is detailed in **Chapter 10: Geology, Hydrology and Hydrogeology** and **Technical Appendix 9.2: Peat Management Plan** within the EIA Report.

### 2.1.8 On-Site Fuel and Chemical Storage

All fuel and chemicals will be stored within appropriately specified containers and within specifically designed stores / storage areas and shall include appropriate measures to avoid spillages in line with the relevant legislation. Further information on the fuel and chemical storage will be provided within the Principal Contractor's Construction Phase Plan (CPP) prior to the construction phase of the proposed development.

### 2.1.9 Waste Management

A Waste Management Plan (WMP) will be developed as part of the detailed CEMP. The WMP shall detail how all waste materials shall be managed, including the management and definition of excavated materials.

The Principal Contractor shall take all reasonable steps to ensure that all waste from the Site is dealt with in accordance with the requirements under the Environmental Protection (Duty of Care) Regulations 1991 (and amendments) and that materials shall be handled efficiently, and waste managed appropriately.



Appropriate waste management, disposal and waste carrier documentation and licences shall be obtained (e.g., complete waste transfer notes prior to waste leaving Site, ensure all waste carriers have a valid waste carrier's registration certificate, ensure wastes are disposed of at a correctly licensed site, complete notification for hazardous waste to SEPA).

Waste streams shall include wastes generated by plant, machinery and construction workers over the period of the works, for example waste oils, sewage, refuse (paper, carton, plastic etc.), wooden pallets, waste batteries, fluorescent tubes etc.

The WMP will also contain details of the forestry waste management proposed for the Site which will follow SEPA guidance and the Waste framework directive waste hierarchy. It is anticipated that all forestry by products from felling will either have a reuse offsite as chipped wood products or be used on the Site as, for example, brash mats for felling.

## **2.1.10 Ecology**

### **2.1.10.1 Habitats**

Working areas would be kept to a practical minimum and clearly defined by pegging out the footprint of the proposed development prior to the commencement of works.

This will be carried out by the EnvCoW and the Contractor to ensure sensitive habitats are avoided where possible. The aim of this is to restrict the footprint of the proposed development to a minimum and to reduce the risk of unnecessary damage to these retained habitats. Existing habitats to be retained would be securely fenced prior to the commencement of site clearance. Fencing will be fit for purpose and be clearly visible to drivers of large construction vehicles. No materials storage or fires would be permitted within the fenced areas. The fences will be maintained to ensure their continued function throughout construction but will be removed from site on completion of the works.

All vegetation clearance works will be undertaken under the supervision of an EnvCoW who will adopt a surveillance programme for protected species places of rest, refuge and/or breeding prior to vegetation stripping or construction works. The surface layer of soil/peaty soils and vegetation will be stripped separately from the lower soil layers (where practical, noting the existing disturbance of the upper layers from existing and historic forestry works), stored separately, and replaced as intact as possible once the construction phase is complete. Turf material will be replaced as far as possible in similar locations to where it was removed. Best practice techniques for vegetation and habitat re-instatement will be adopted and implemented on areas subject to disturbance, such as the temporary construction compound area, as soon as is practicable.

### **2.1.10.2 Protected Species**

No earlier than 12 months, and preferably within 6 weeks prior to commencement of works, an EnvCoW / ecologist would be commissioned by the applicant to carry out a walkover survey of the footprint associated with the construction of the proposed development (in line with survey requirements) in conjunction with the Project Manager (or nominated individual) and a representative of the Contractor(s), with the aim of updating the survey dataset and to inform any micro-siting and agreeing, insofar as possible, all elements of the proposed development, such that the impacts of the proposed development on sensitive ecological features are managed by design.

A Site speed limit of 15mph will be in place at all times to reduce the risk of collision and protected species mortality associated with construction vehicles.



In the event that a European protected species is discovered on Site, all work in that area would stop immediately and the EnvCoW contacted. Increased buffer areas may be required in these locations.

Species protection plans for Red Squirrel, Pine Marten, Bats, Badger and Otter will be developed post consent and will form part of the CEMP.

### 2.1.11 Ornithology

Clearance of potential nesting habitat would be undertaken outside the breeding bird season where practicable. Should this be required between March and August, vegetation will be checked by an experienced ornithologist prior to works commencing to identify the presence of any nesting birds. Clearance will only commence once a check has been undertaken and approved for clearance by the ornithologist.

Borrow pits, construction compounds, access routes, and any other construction activities / mobilisation that require ground-breaking or land-take of habitat will additionally be programmed and undertaken out with the breeding bird season.

If these works are required to take place between March and August, then they will be subject to a ground nesting bird survey by an experienced ornithologist. If breeding activity is recorded, particularly for target species, the EnvCoW will advise on requirements. Suitable protection / disturbance free buffer zones for nesting birds within the proposed development, where present, will be outlined by the ornithologist and agreed with the EnvCoW and works contractor.

### 2.1.12 Archaeology

A watching brief will be undertaken on any ground works within 50m of assets identified on the Site in Chapter 7 of the EIA Report. If significant archaeological remains are identified during the watching brief, there is the potential that further works, such as excavation and post-excavation analyses, could be required. Details of mitigation will be agreed with Moray Council in consultation with Aberdeenshire Council Archaeology Service through a Written Scheme of Investigation (WSI).

## 2.2 Temporary Lighting

Temporary lighting will be required at the construction compound for security purposes and to ensure that a safe working environment is provided to construction staff. In addition, temporary lighting may be required to ensure safe working conditions at access tracks, hardstands and compounds during construction.

All temporary lighting installations will be facing downward and all lights will be switched off during daylight hours. The Environmental Clerk of Works (as discussed below in section 2.7) shall supervise the use of temporary lights to ensure that protected species are not impacted, see **Chapter 8: Ecology** of the EIA Report for further details.

## 2.3 Peat Slide Risk and Slope Stability

A Stage 1 Peat Landslide Hazard and Risk Assessment has been undertaken as part of the EIA Report (see **Technical Appendix 10.1**) and the design of infrastructure has considered the findings of the assessment. The recommendations highlighted will be followed.

Prior to construction commencement, detailed method statements will be prepared to address the working methods to be used. Additionally, a toolbox talk will be provided by the



site management team to highlight possible events causing slope instability and provide guidance on best practice when operating in areas identified as at risk.

## 2.4 Post Construction Restoration and Reinstatement

During construction of the infrastructure elements (detailed in section 3), once any required felling has taken place, the top/vegetated layer (as appropriate) will be stripped from the excavation area and stored locally with the growing side up. The remaining organic topsoil and subsoils will be excavated down to formation level, or a suitable stratum, and again will be stored local to the point of excavation but shall remain segregated to avoid mixing of materials.

Temporary storage areas shall take consideration of all identified buffer areas and be stripped of vegetation prior to stockpiling in line with best working practices. As construction is progressed the effectiveness of the buffer zones will be reviewed and if necessary adjusted. Alternatively, the construction procedure may be reviewed and altered, or additional control measures put in place.

Post-construction reinstatement will be undertaken as work progresses to minimise the period any organic material is stockpiled. Subsoils shall be used in landscaping and backfilling around structures while the vegetated layer and/or topsoil will be used to reinstate storage and working areas, access track verges, drainage swales and embankments. In addition, following the completion of the works, a final inspection of the proposed development will be undertaken and in circumstances where reinstatement using vegetation and/or topsoil is unsuccessful alternative methods will be considered.

Upon completion of all construction works, all temporary structures and construction equipment will be removed and the granular material that forms the temporary hardstands will be moved to areas agreed with the landowner or removed from site. Following this, the areas will be backfilled with material stripped and stored during the construction and reseeded as required.

In line with construction best practice and to suit the ground conditions anticipated on-site, the access track and hardstand design has endeavoured to minimise spoil generated during construction.

## 2.5 Traffic Management

Details of the proposed traffic management arrangements will be contained in a Construction Traffic Management Plan (CTMP). Any operations not covered by the CTMP will be performed in accordance with local and national standards and specifications. All abnormal load movements associated with the proposed development will be performed in accordance with the delivery route shown in **Figure 11.5: Abnormal Load Access Route**.

## 2.6 Health and Safety Management

The Principal Contractor will be responsible for ensuring that a CPP is prepared and implemented on-site. All work will be carried out in accordance with:

- The Health and Safety at Work etc. Act 1974; and
- The Construction (Design and Management) Regulations 2015.

The construction works for the proposed development will fall under the CDM Regulations 2015. As such, the Principal Contractor shall provide a Construction Phase (Health and Safety) Plan in accordance with the CDM regulations. This plan will include (but not be



limited to) a construction programme, emergency procedures, site layouts and fire plans, method statements and details of the proposed induction programme.

An induction shall be required for all personnel on Site (permanent / temporary / contractor / subcontractor), site visitors, client representatives or other 3rd parties. Inductions shall be documented.

Plant operators and construction staff shall be trained by the Principal Contractor with regard to spill prevention/mitigation measures and procedures and in the use of relevant mitigation material (e.g. spill kits).

Staff and subcontractors employed by the Principal Contractor shall be trained and have to prove certification for any plant, vehicle or use of specialist equipment such as electrical and hot works.

## **2.7 Environmental**

An Environmental Clerk of Works (EnvCoW) will be appointed, and will be fully engaged in preparatory works undertaken, with their terms of appointment extended throughout the construction period into the operational period. The agreed terms of appointment, to be agreed with the relevant authorities, will be provided prior to construction.

The provision of an Archaeologist will be implemented during any excavation works, in agreement with the relevant authorities, and a Written Scheme of Investigation will be provided, agreed and applied to all applicable areas of work.

## **2.8 Unexploded Ordnance**

Chapter 19 of the original 2007 Environmental Statement discussed the historical land use of part of the Site as a military training area (the Fochabers Training Range), consisting of two mortar firing ranges, a medium machine gun range and a field firing range, located in the western part of the Site around the Hill of Stoneyslacks and Millstone Hill<sup>1</sup>.

It concluded that although several MOD clearance exercises have been carried out in the 1950s and 1960s, there was still some residual risk from unexploded ordnance to personnel working in localised areas of the Site.

It is anticipated that a remediation strategy for unexploded ordnance will form part of the planning conditions for the Site (similar to that agreed with Moray Council for the consented site), which will ensure the safety of any Site workers, visitors or members of the public.

## **3.0 Design Philosophy and Construction Methods**

### **3.1 Micro-siting of infrastructure**

During the detailed design phase, the location of the proposed infrastructure may need to be micro-sited, though at this stage in the design process there is no planned micro-siting of infrastructure. A micrositing allowance of 100m has been requested in the EIA Report.

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<sup>1</sup> See Aultmore ES, Chapter 19, 2007, available on the Moray planning portal under planning reference 07/02375/EIA.





## 3.2 Site Entrance

It is proposed that construction traffic and abnormal indivisible loads (AIL) will reach the site entrance via the B9016.

Public roads will be inspected daily, and a road sweeper will be employed as required to remove any mud or debris transferred onto the roads from site activities.

## 3.3 General Construction Method

The site entrances and new junctions will be constructed in accordance with the design drawings as follows:

- Traffic management to be installed;
- Topsoil removed and stockpiled;
- New drainage to be installed, ensuring existing drainage isn't compromised;
- Earthworks and road pavement works to be completed to the design requirements; and
- Line marking, signage, fencing, visibility splay clearance and vehicle restraint systems required as part of the design will be installed.

## 3.4 Temporary Construction Compounds, Access Tracks and Crane Hardstands

### 3.4.1 Temporary and Batching Compounds

Temporary compound is required for the provision of site offices, welfare facilities and storage arrangements for materials, plant and equipment. There are two temporary construction compounds required for the construction phase of the proposed development, along with a batching plant compound.

Initial welfare provision will be made for use during construction of the access tracks to the temporary construction compound. This will likely be a single unit for use by a small workforce tasked with the enabling works.

The temporary construction compound will be the main compound for the proposed development with welfare facilities at this location.

An area will be assigned for the storage of fuels and chemicals, ensuring any spillage is captured and appropriately dealt with.

### 3.4.2 Access Tracks

The running width of the access tracks will be typically 5m (7m for the spine road) on straight sections with shoulders constructed as required. Shoulders are likely to increase at corners and passing places to accommodate the swept path of wind turbine delivery vehicles. The access track working area will be kept to the minimum required allowing for safe access, drainage and electrical works.

Access tracks will consist of compacted stone. Where access tracks cross over services such as gas pipelines or electricity cables, they will be designed in consultation with the relevant authority and accordance with their specific requirements.



A number of access track designs may be utilised at the proposed development which will be determined during detailed design, dependent on the ground conditions encountered on-site and include:

- Excavated access track, founded on suitable load bearing strata;
- Floated access track, laying a suitable membrane directly on existing ground level and constructing off that layer;

Access track drainage will be incorporated within the design in accordance with sustainable drainage design principles. Where the access track alignment crosses existing drainage channels, crossings appropriate to the location will be designed in accordance with the relevant guidelines.

A buffer zone of 50m in accordance with the relevant guidance from SEPA will be maintained around watercourses. The exceptions to these buffers will be where the existing access tracks are located within the buffer zone and where there are watercourse crossings. Site personnel will be made aware of the buffer zones through the site induction and specific tool box talks.

#### **3.4.2.1 Excavated Access Track**

Excavated access track construction may be used in areas identified where the thickness of soft soils is low, and the underlying layer has adequate load bearing properties. This system will likely consist of a suitable capping layer and then a suitable running layer.

#### **3.4.2.2 Floated Access Track**

Floated access track construction may be adopted where the ground conditions require. This system involves installing geo-grid directly onto the organic or exposed soil layer and placing layers of suitable stone and additional geo-grid (as required) above until the access track design level is achieved.

#### **3.4.3 Crane Hardstands**

The main crane hardstand area is anticipated to be 60m x 40m. There may be additional temporary hardstand areas required for the erection of the main crane, lay down of materials and wind turbine components.

The main crane hardstand area will be uncovered for the operational phase of the Proposed Development in line with good practice outlined in the Scottish National Heritage guidance 'Good Practice during Windfarm Construction' – 4th Edition 2019. Any temporary crane hardstand elements will be reinstated post construction.

All crane hardstands will consist of a compacted stone structure bearing directly on a suitable formation strata.

### **3.5 General Construction Method**

Where competent soils exist close to the existing ground level the following construction method will typically be followed:

- Access track and crane hardstand alignments will be established from the construction drawings and marked out with ranging rods, timber posts or steel pins;
- Access track corridors and crane hardstand locations shall be pegged out 500 – 1,000m in advance of operations;



- Where possible, upgraded access tracks will re-use the structure of the existing track to reduce construction requirements;
- Drainage swales will be excavated adjacent to the access tracks where required. Surface water runoff will not be allowed to discharge directly into existing watercourses but will be routed through SuDS;
- A surface water cut off ditch may be installed on the slope above the earthworks footprint where achievable given the topography;
- Material will be excavated and stored;
- Excavated access track construction will be used where shallow soils are identified. This excavated access track system will likely consist of a suitable layer of crushed stone, either spread by a dozer or placed by hydraulic excavator, prior to being compacted in layers by vibratory rollers. If ground conditions dictate, a geotextile membrane will be applied;
- Crane hardstand construction will follow the same construction method as excavated access track;
- Floated access track construction may be adopted where the ground conditions dictate. This system involves installing a geogrid membrane directly onto the organic vegetated layer and placing layers of suitable stone and additional geogrid layers (if required by the design) above;
- Where the access track alignment crosses existing drainage channels, crossings appropriate to the location will be designed in accordance with the relevant guidelines; and
- Depending on depth and type of material, adjacent slopes are anticipated to be between 1:1 to 1:3.

Post-construction reinstatement shall be in line with the details of Section 2.4.

Where the load bearing properties of the underlying soils are determined to be insufficient, ground stabilisation may be carried out to provide adequate bearing capacity of the formation level. Due to the variable nature of the ground at the site, specific construction methods shall be selected at detailed design stage in consultation with specialist contractors. Such methods may consist of:

- Compaction of the existing in situ soils;
- Lime/cement stabilisation of the existing in situ soils; or
- Installation of stone or concrete columns to provide adequate support.

### 3.5.1 Wind Turbine Foundations

Foundations will be designed as a steel reinforced concrete slab, in accordance with the relevant design standards, specific wind turbine supplier load information and ground conditions. Due account will be taken of guidance provided in appropriate codes and standards such as Eurocodes, British Standards and other specialist design documents.

Due to the anticipated load bearing capacity of the near surface soils, gravity base wind turbine foundations are expected to be used to support the wind turbine, although piled foundations are also discussed in **Chapter 2: Proposed Development Description**.



### 3.5.1.1 General Gravity Base Construction Method

The gravity base foundation general construction method would generally be as follows:

- A surface water cut off ditch may be installed on the slope above the earthworks footprint where achievable given the topography;
- The topsoil will be excavated and stored to one side for reuse during the landscaping round the finished wind turbine;
- Excavation will be undertaken to competent material. Excavated subsoil material may be stockpiled temporarily adjacent to the excavation for later use as backfill or stored elsewhere on-site. Temporary & permanent drainage shall be installed at the same time as the excavated works;
- Where competent material is lower than the required formation level the foundation will likely be over-excavated to competent material and compacted engineering fill placed to the required level;
- Where excavation is required to extend below the water table or in material which does not drain freely, temporary pumping will be employed to keep the excavation dry. Water pumped from an excavation shall be adequately treated in line with the SuDS philosophy, before being discharged directly into any watercourse;
- A layer of Type 1 stone will be laid down on top to the newly exposed formation.
- A layer of concrete blinding will be laid directly on top of the newly laid formation, finished to ensure a flat and level working surface;
- Steel reinforcement, the wind turbine anchorage system and cable ducts will be fixed in place and formwork erected around the steel cage;
- Concrete will be placed using a pump, or other suitable device, and compacted using vibrating poker;
- Following the settling process, the foundation will be backfilled with suitable material, and landscaped using vegetated soil layer set aside during the initial excavation; and
- A gravel path will be built leading from the access track or crane hardstand to the wind turbine door or access steps and around the wind turbine for maintenance.

### 3.5.1.2 General Piled Type Foundations

The piled type foundation construction method would generally be as follows:

- A surface water cut off ditch may be installed on the slope above the earthworks footprint where achievable given the topography;
- The topsoil will be excavated and stored to one side for reuse during the landscaping round the finished wind turbine;
- A suitable level piling platform will be constructed which will likely consist of compacted stone designed to comply with the requirements of the piling rig being used;
- Formation of the pile shaft will be achieved by rotary methods to the required depth and embedment in the competent soils or bedrock. Any spoil produced shall be removed and stored at the selected location within the site. Depending on the selected piling technique, it may be necessary to insert temporary casing into the ground to support the pile bore;



- Delivery and placement of the concrete into the pile bore will be undertaken using a concrete pump;
- The pile reinforcement cage may be installed before or after the concrete placement depending on the selected technique;
- On completion of all the piles within a wind turbine foundation, the piling rig and ancillary equipment shall be moved to the next wind turbine location as required; and
- A reinforced concrete pile cap, connected to the piles below, would then be constructed in much the same manner as the gravity type foundation.

### **3.5.2 Wind Turbines and Transformers**

#### **3.5.2.1 Wind Turbines**

The wind turbine will typically be supplied with a light grey semi-matt finish (RAL colour 7035) and installed with a height not exceeding 200m measured from ground level to the blade tip in the vertical position.

The wind turbines shall not carry any symbols, logos or other lettering except where required under other legislation. However, the applicant proposes to add wind turbine numbers to the base of each tower to aid service engineers during the operational phase of the wind farm.

In line with health and safety best practice, wind turbine manufacturers have indicated a preference to locate a passive infra-red (PIR) detector and light above each wind turbine door. It should be noted that this lamp will not be permanently lit and would only be switched on by the PIR when personnel approach a particular wind turbine.

#### **3.5.2.2 General Wind Turbine Erection Method**

The following general steps will be undertaken to erect the wind turbines on-site:

- Wind turbine components will be lifted by adequately sized cranes (one main crane and one smaller tail crane) and positioned on the foundations/ other wind turbine sections until the wind turbine is erected;
- Upon completion of the erection all fasteners will be tightened and the internal fit out of the wind turbines undertaken;
- The wind turbines will then be connected to the wind farm substation; and finally
- Wind turbine testing and commissioning will be undertaken before the wind turbines will be handed over as complete.

#### **3.5.2.3 Wind Turbine Transformers**

Depending on the model of wind turbine finally chosen for the proposed development, wind turbine transformers will either be placed internally, or externally in close proximity to the wind turbine.

Oil cooled transformers will be supplied full of oil and will not require topping up on-site. The transformers will be sealed and will be inspected for any damage prior to offloading. Air cooled or cast resin transformers do not require cooling oil.

Exterior transformers will be located within enclosures which shall be locked, accessible by trained and authorised personnel only, and displaying appropriate warning signs.



### 3.5.3 Substation and BESS Compounds

Cables will transfer power from the wind turbines to the substation compound before being transferred to the National Grid. In order to stabilise the peaks and troughs of supply of electricity to the National Grid a battery energy storage system (BESS) is proposed within the site.

The buildings have been designed, sized and positioned to be sympathetic with the surroundings. The buildings typically contain the following rooms; control room, switch room, SCADA room, and equipment store and welfare facilities.

The detailed design of the foundations for the buildings will be based on the site investigation reports and building requirements and will ensure loads associated with the buildings are transferred to the appropriate bearing layer in the sub-surface.

Foul drainage will be provided in agreement with the relevant authorities and most likely involve foul effluent disposal via chemical facilities with periodic tankered removal by a licensed waste haulier for licensed offsite disposal (i.e. there shall be no emission on site).

Communications to the site is anticipated to be provided via direct cable connection with the service provider.

#### 3.5.3.1 General Construction Method

The compounds will generally be constructed in accordance with the following:

- A surface water cut off ditch may be installed on the slope above the earthworks footprint where achievable given the topography;
- The plan area of the substation control building and compound will be set out and the topsoil stripped and removed to a temporary stockpile;
- The building foundations will be excavated and concrete poured;
- The building structure will be constructed from the foundations, in accordance with current practice and specific designs; and
- The internal fit out of the building including installation of services will be completed.

### 3.5.4 Borrow Pits

The construction of Site roads, hardstandings, foundations, compounds and other structures would require approximately 188,000 m<sup>3</sup> of rock. It is anticipated that the majority of this rock can be sourced onsite from one of the onsite borrow pits, with some stone potentially being required for enabling works and the construction of the site entrance.

As noted in Technical Appendix 10.5: Borrow Pit Assessment of this EIA Report, four potential borrow pits have been identified.

#### 3.5.4.1 Borrow Pit Setup

Cut off ditches would be installed to intercept surface water before it reaches the workings, this together with any run off from the borrow pit would be directed into settlement ponds or similar settlement system to be agreed with SEPA prior to discharge into an existing watercourse or soak-away.

Fencing would be installed around the borrow pit to ensure the safety of construction workers and others during operation and post restoration.



The overburden would be carefully stripped and maintained in a designated area within the borrow pit site, any other overburden such as sand or clay would be stored separately.

An area would be designated for stone crushing and storage. This area would be screened from the wind to prevent dust been blown out of the borrow pit area. If necessary stone storage areas would be covered or sheeted when not in use.

#### **3.5.4.2 Rock Extraction**

Rock would, where possible, be extracted using an excavator or ripper dozer. Where this is not possible, a specialist contractor would carry out blasting. Where required the rock would be crushed at the borrow pit by jaw and cone crushers to a suitable size. The size of rock would depend on its final use. Good quality rock would be set aside to use as the wearing course on the site roads. The rock would then be graded transferred into off road dumper trucks for haulage to the construction locations where the stone is required.

The borrow pit/s would be operated to facilitate subsequent restoration. Permanent benches would be established, and slopes restricted in gradient to allow re-vegetation post operation.

All operations will be carried out in accordance with the Quarries Regulations 1999 and associated Approved Code of Practice.

#### **3.5.4.3 Borrow Pit Restoration**

On completion of the works, the borrow pits would be restored and reinstated to agreed profiles, indicative restoration profiles are provided in Technical Appendix 10.5 of the submitted EIA Report. Restoration of the borrow pits would be carried out using the overburden and soft soils where practical. General fill material would be sourced from the stockpiles located within the borrow pit void. These would comprise of materials with unsuitable engineering properties for the proposed development construction such as weathered rock and unsuitable/poor quality rock horizons, and unsuitable materials arising from the crusher/blasting operations. This material would be utilised to provide the basis of the restoration profile.

Benched rock faces would be angled to allow revegetation and ledge tops would be soiled and reseeded where required. Detailed proposals for the restoration of each borrow pit would be produced with the advice of the ecologist; these would be approved by the local authority, SEPA and Nature Scot prior to its commencement.

An EnvCoW would be in place, to monitor the restoration and aftercare of the borrow pits.

### **3.5.5 Cabling Works**

All electricity and other service cables between the wind turbines and the substation will be placed underground and alongside of access tracks.

The detailed construction and trenching specifications will depend on the ground conditions encountered but typically cables will be directly buried inside a trench, except at access track crossings when cables will be ducted.

Specific cable layout plans will be provided prior to construction.

#### **3.5.5.1 General Construction Method**

The following construction method will typically be used:

- Ground will be surveyed for existing underground services;



- Trenches will be excavated and a suitable bedding material placed to lay the cables upon. The ground is trenched typically using a mechanical digging machine;
- The cables shall be laid directly onto the bedding material and warning tape will be laid within 300mm above the cable;
- The trench will be backfilled and compacted with suitable material up to the required level and finished with a layer of topsoil to reinstate the trench and;
- The cables are terminated on the switchgear at each wind turbine and the substation.

## 4.0 Outline Decommissioning Plan

Prior to decommissioning, a detailed site restoration scheme will be provided to the relevant authorities for written approval.

Outlined in the following sections are the general procedures to be followed in the decommissioning of the proposed development based on current knowledge.

### 4.1 Access Track & Hardstand Areas

Access tracks and hardstand areas constructed will be reinstated to the approximate pre-wind farm condition, unless otherwise agreed with Forestry and Land Scotland (FLS) and/or Moray Council. It is possible that the FLS will adopt the tracks and hardstandings into their ongoing forestry plans for access into coupes etc. Areas to be reinstated would be treated in the following way:

- The material used to construct the access tracks will be taken up and removed to areas identified in the site restoration scheme;
- The areas will be backfilled with suitable fill material, covered with topsoil and reseeded as required;
- Backfilling of access tracks will be carefully planned to avoid unnecessary plant and equipment movement on freshly reinstated land; and
- Any access tracks which were upgraded during the development of the wind farm would be left unchanged from the conditions used during the operation of the wind farm.

### 4.2 Wind Turbines

The decommissioning of the wind turbines will be the reverse of the erection process involving similar lifting plant and equipment:

- Wind turbines will be disconnected from the cabling and internal components stripped and taken off site;
- It is anticipated that the wind turbine nacelle would be taken down and loaded straight onto the back of transport vehicles and removed from site for reconditioning or scrap; and
- The wind turbine towers and blades would be taken down and either transported directly off site or broken down into smaller components if required.





### 4.3 Wind Turbine Foundations

It is widely accepted that there is no appreciable effect on the local environment from buried reinforced concrete structures left in-situ due to the inert state of concrete. Therefore, the foundations will be reinstated as follows:

- Following the removal of the wind turbine, topsoil and subsoil will be excavated to expose the top of the foundation and stored for reuse;
- The reinforced concrete foundation will then be broken out to an agreed depth below existing ground level and the material will be removed as identified in the site restoration scheme; and
- The excavation will be backfilled with suitable fill material, covered with topsoil and reseeded as required.

### 4.4 Substation and BESS Compounds

The substation and BESS compounds will be decommissioned by disconnecting and dismantling all the surface plant. Solid structures such as the building and equipment will be demolished and moved off-site. Reinforced concrete foundations will be broken down to an agreed depth below ground level. Ducting and cabling that is within the depth to be cleared will be removed.

The fence surrounding the compound will be removed and the area landscaped so it can revert to its original state.

### 4.5 Electrical Equipment

The electrical equipment will be decommissioned in the reverse of the installation method involving similar plant. The equipment will be dismantled, removed from site and disposed of in an appropriate manner.

#### 4.5.1 Cabling

Cables will be removed if it is deemed that removal would not be detrimental to the local environment. If removed, trenches will be backfilled with material removed during the cable removal process, covered with topsoil and reseeded as required.

## 5.0 Records

Records, as-built drawings, specifications, operational maintenance manuals and residual risks will be collated and filed in the health & safety file based upon the requirements of CDM Regulations 2015.





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